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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/955,712	09/19/2001	Vladimir M. Shalaev	37000-0015	1002

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EXAMINER

LAVARIAS, ARNEL C

ART UNIT PAPER NUMBER

2872

DATE MAILED: 03/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/955,712

Applicant(s)

SHALAEV ET AL.

Examiner

Arnel C. Lavarias

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The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 1/9/02, 4/8/02, 5/24/02, 9/18/02, 2/11/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-60 is/are pending in the application.
- 4a) Of the above claim(s) 2-13, 25, 26, 28, 29, 32-35 and 49-58 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 14-24, 27, 30, 31, 36-48, 59 and 60 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4, 5, 6, 8. 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Group III, Claims 14-18, 21, 24, 36, 39, 42, 45, and 48) in Paper No. 9, dated 2/11/03 is acknowledged.
2. Claims 2-13, 25, 26, 28, 29, 32-35 and 49-58 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 9, dated 2/11/03.

### *Specification*

3. The disclosure is objected to because of the following informalities:  
Page 4, line 4- insert 'one' after 'least'  
Page 16, line 18; Page 26, line 23- 'semincontinuous' should read 'semicontinuous'  
Page 23, line 15- 'using' should read 'use'  
Page 26, lines 14 and 20- 'porous' should read 'pores'  
Page 27, line 23- 'white-light' should read 'white-light,'.  
Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 19-20, 22-23, 30-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Ducourtieux et al. (S. Ducourtieux et al., "Percolation and fractal composites: Optical studies", J. Nonlinear Optical Physics & Materials, vol. 9, No. 1, 3/2000, pp. 105-116).

With regard to Claim 1, Ducourtieux et al. discloses an optical enhancing material comprising a medium, the medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters at approximately their percolation threshold (See Page 105, Section 1: Introduction; Page 106, Section 2: Percolation metal-dielectric films: Field distribution and enhanced optical nonlinearities).

With regard to Claims 19-20, 22-23, 30-31, Ducourtieux et al. discloses an optical sensor comprising a medium, the medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters at approximately their percolation threshold (See Page 105, Section 1: Introduction; Page 106, Section 2: Percolation metal-dielectric films: Field distribution and enhanced optical nonlinearities); a light source incident on the medium; and one or more detectors of light emitted from the medium, the detector detecting a harmonic generation signal (See Section 2, Pages 106-111).

With regard to Claims 59-60, Ducourtieux et al. discloses a sub-femtosecond pulse generation device comprising a medium, the medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters at approximately their percolation threshold (See Page 105, Section 1: Introduction; Page 106, Section 2:

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Percolation metal-dielectric films: Field distribution and enhanced optical nonlinearities); a light source incident on the medium; and one or more near-field detectors of light emitted from the medium (See Section 2.2, Pages 109-111).

6. Claims 1, 19-20, 22-23, 30-31, 43-44, 59-60 are rejected under 35 U.S.C. 102(b) as being anticipated by Shalaev (V. M. Shalaev, "Nonlinear optics of random media: Fractal composites and metal-dielectric films", Springer-Verlag, Berlin, 12/1999).

With regard to Claim 1, Shalaev discloses an optical enhancing material comprising a medium, the medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters at approximately their percolation threshold (See Pages 1-5; Chapter 5).

With regard to Claims 19-20, 22-23, 30-31, Shalaev discloses an optical sensor comprising a medium, the medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters at approximately their percolation threshold (See Pages 1-5; Chapter 5); a light source incident on the medium; and one or more detectors of light emitted from the medium, the detector detecting for example a Raman scattering signal (See Pages 134-139).

With regard to Claims 43-44, 46-47, Shalaev discloses an optical switch comprising a medium, the medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters at approximately their percolation threshold (See Pages 1-5; Chapter 5); a light source incident on the medium, and a layer of optical switching material in the form of particles (See Pages 135-136, particularly the section regarding

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local nano-photomodification of percolation films wherein the local field intensity is switched to a different state after photomodification).

With regard to Claims 59-60, Shalaev discloses a sub-femtosecond pulse generation device comprising a medium, the medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters at approximately their percolation threshold (See Pages 1-5; Chapter 5); a light source incident on the medium; and one or more near-field detectors of light emitted from the medium (See Pages 139-141).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 14-18, 21, 24, 27, 36-42, 45, 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shalaev (V. M. Shalaev, "Nonlinear optics of random media: Fractal composites and metal-dielectric films", Springer-Verlag, Berlin, 12/1999).

Shalaev discloses the invention as set forth above in Claim 1, except for the material additionally comprising a microcavity or microresonator made of one or materials selected from the group consisting of dielectric and semiconductor materials; the microcavity being selected from the group consisting of spheres, deformed spheres, spheroids, rods, and tubes; the microcavity being a semiconductor laser cavity; the

medium being located at one or more surfaces of the microcavity selected from the group consisting of inner and outer surfaces; and the medium being an integrated component of the microcavity. However, in a separate chapter regarding fractal aggregate type random nanocomposite films (See Chapter 3), Shalaev discloses the use of such fractal aggregate films in microcavities (See Pages 69-73) wherein lasing emission was experimentally verified utilizing Rhodamine 6G embedded in silver fractal aggregates inside a cylindrical cavity (See in particular Pages 69-70). Since fractal aggregate films and random metal-dielectric films (i.e. percolation composite films) are extremely similar (See Pages 2-4 regarding a discussion on the similarities and differences between aggregate films and random metal-dielectric films), it would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the fractal aggregate film with a random metal-dielectric films (i.e. percolation composite films), and have the film additionally comprise a microcavity or microresonator made of one or materials selected from the group consisting of dielectric and semiconductor materials; the microcavity be selected from the group consisting of spheres, deformed spheres, spheroids, rods, and tubes; the microcavity be a semiconductor laser cavity; the film be located at one or more surfaces of the microcavity selected from the group consisting of inner and outer surfaces; and the film be an integrated component of the microcavity, as taught by Shalaev, for the purposes of enhancing the resonance response and optical nonlinear properties of laser gain media, thus reducing the required concentrations and pumping requirements for these laser gain media.

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*Conclusion*

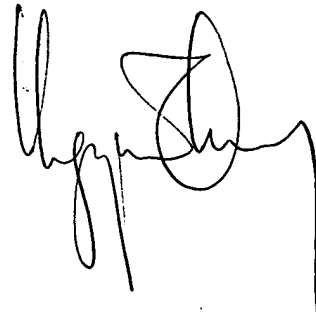
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnel C. Lavarias whose telephone number is 703-305-4007. The examiner can normally be reached on M-F 8:30 AM - 5 PM.

The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1782.



Arnel C. Lavarias  
March 27, 2003



Thomas A. Jones  
March 27, 2003